Use of Correlation Coefficient Technique for Quantitative Evaluation of Landuse in Ahmednagar District in 1960-61 And 2010-11

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Abstract: *The area of Forest Cover, Net Sown Area Land Not Available for Cultivation, Fallow Land and Cultivable Waste have been converted into percentage to total geographical area are included in agricultural land use. Use of land is an important factor for planning process because of the finite nature of land resource. Ahmednagar district in Maharashtra covered an area of about 17 lakh hectare comprising nearly 73.52 percent area under net sown area in 1971-1972. This study was based on the data and information to uncover the association between landuse and physio-socio-economic variables in the area under review. This established association was evaluated by suitable quantitative methods for further strengthening the results. The point of view, to evaluate relationship between the variables by applied quantitative techniques in the Ahmednagar District.*

Key Words: Crop Diversification, Land Utilization, Net Sown Area.

I. INTRODUCTION

Agriculture is backbone of Indian economy. Agricultural scientists, economists, geographers and many others are engaged in the study of agriculture. Utilization of land is requires proper planning for being limited resource. The cultivation of crops and their growth are closely related to the decision making process on one hand and adaptation of innovation in agriculture, i.e. use of high yielding varieties, improved and efficient instrument, applications of chemical fertilizers and pesticides. The hectare under individual crop gives relative strength and realistic picture of crop landuse in the analysis of crop ranking of the region. The ranks of crops and their combination provide spatial variation in the distribution patterns. In this respect the study of crop combination and diversification manifests the present agricultural scenario.

The present research paper deals with the quantitative evaluation of agricultural landuse pattern of the Ahmednagar District.

II. DATA SOURCE

Secondary data has been used from Socio-Economic Reviews and District Statistical Abstracts of Ahmednagar District from 1961 to 2011. The data have been collected for various crops for the year 1960-61 and 2010-11 in both kharif and rabbi crops from taluka headquarter office, Ahmednagar District Gazetteer, Socio-Economic Abstract of Ahmednagar District and Census Handbook of Ahmednagar District are sources of data for this study. Seventeen variables were carefully selected to assess the relationship for correlation coefficients were used for finding regression.

III. OBJECTIVES

1. To present area strength of the crops grown in the tahsil
2. To find out the correlation between selected agricultural landuse variables and environmental variables by applying correlation coefficient quantitative technique.

IV. STUDY AREA

Ahmednagar district in western Maharashtra region of Maharashtra state is an economically and agriculturally developed area. In 1961-62, there were thirteen tahsils in Ahmednagar district. The District 'Ahmednagar' is located middle part of the bank of Godavari and Mula river. This lays between 18°02′ North 19°09' North to 73°09′ East 75°05′ East longitude with an area of 1701836 hectors of land and in Thirteen tahsils as per 1971-72 District gazetteer. It has an average elevation of 549 metres (1,801 ft) from mean sea level Physiography, rainfall, soil, temperature, and drainage influences on agricultural land use pattern in this district. Rainfall varies between 508 to 635 mms annually. The underline basalt on disintegration and decomposition brought various agents had yielded three kinds of soils viz. Deep black, deep & shallow Alluvial soils in Pravara, Mula and Seena river basins. These rivers are main irrigation source of middle district areas. The rainfall is mainly due to rain shadow area in term of amount of rainfall average receives 571.5 mms in western and middle part of district but southern part of district six tahsil are totally drought prown area. Therefore these areas are mostly hilly and unirrigated. The variation in amount of rainfall & type of soil exerts influence on the Land use pattern of the study region in 1960-61 to 2010-11.

V. METHODOLOGY

A) Correlation Analysis

In order to establish relationship between landuse and environmental variables, the correlation coefficient has been computed. The seventeen variables had been carefully selected from the set of variables of landuse and socio-economic conditions for fourteen talukas in the Ahmednagar District. These chosen variables are as follow:

$X1$ = Percentage of Net sown area to total geographical area; $X2$ = Population density per Sq. km.; $X3$ = Percentage of Irrigation to net sown area; $X4$ = Agricultural density; $X5$ = Percentage of Bajra to NSA; $X6$ = Percentage of Jawar to NSA; $X7$ = Percentage of Wheat to NSA; $X8$ = Percentage of Oilseeds to NSA; $X9$ = Percentage of Pulses to NSA; $X10$= Percentage of Cotton to NSA; $X11$= Percentage of Rice to NSA; $X12$= Percentage of Vegetable to NSA; $X13$= Percentage of Fodder Crop to NSA; $X14$= Percentage of Sugarcane to NSA; $X15$= Percentage of Fruits to NSA; $X16$= Percentage of Maize to NSA; $X17$= Percentage of Condiments and Spices to NSA

VI. RESULT OF CORRELATION COEFFICIENT

The degree of correlation had been computed by applying quantitative technique, namely, correlation coefficient for 16x17a matrix. Pearson product movement correlation was applied. Student 't' test was, later on adopted to ascertain the significance of 'r' value at 0.001 levels. The obtained results are shown in Table 1. The relationship between variables was summarized as above.

	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12	X13	X14	X15	X16	X17
Akole	60.8	193	15.1	49.3	0.03	0.04	4.25	2.21	3.31	0	10.7	4.76	46.6	2.12	0.26	0.07	6.66
Sangamner	61.3	246	41.7	72.9	64.1	2.4	5.71	5.98	3.84	1.37	0.17	12.5	4.63	11.2	3.84	3.05	0.26
Kopargaon	72.9	331	64.4	91.3	17.2	4.22	16.4	33	7.84	10	0	11.9	4.55	6.31	1.47	12	0.3
Rahata	85	431	98.8	70.6	17.5	4.22	11.6	24.5	4.87	1.84	0	2.57	3.72	5.67	4.09	2.37	0.12
Shrirampur	81.4	349	135	77.3	20.5	5.09	14.2	17.4	8.79	7.43	0	3.76	8.9	5.59	1.02	1.95	0.32
Newasa	83.6	291	40	75.5	1.58	1.49	3.15	1.53	3.75	25.9	0	2.25	1.55	43.7	3.66	0.51	1.23
Shevgaon	89.2	239	149	31.1	6.7	5.85	1.15	0.12	0.73	14.8	0	4.3	0.51	0.2	0.35	0.07	0.05
Pathardi	38.8	195	65.5	52	59.3	50.6	0.28	0.56	3.22	10	0	0.34	0.62	3.13	5.34	0.3	0.04
Nagar	75.9	207	39	79.7	40.5	52.8	6.07	1.26	1.74	0.02	0	1.21	0.59	0.13	0.24	0.35	0.14
Rahuri	59.1	271	76.2	53.4	25.7	2.19	19	0.93	4.66	0.58	0	3.65	5.32	25.4	0.89	1.63	0.3
Parner	78.3	142	28.3	84.1	34.2	50.1	2.6	5.43	8.3	0.02	0	3.76	0.68	0.89	0.53	0.4	0.5
Shrigonda	69	187	33.1	54.3	2.1	59.1	8.7	0.2	1.65	0.01	0	2.21	0.31	2.17	0.97	0.97	0.29
Karjat	50.7	155	16.8	45.4	17.7	59.8	2.54	0.24	3.61	0.53	0	2.83	0.28	1.07	0.58	0.04	0.37
Jamkhed	60	180	27.3	95.2	11.8	82.2	0.78	5.35	47.9	3.39	0	1.02	1.72	1.04	2.66	0.59	0.17

IJARSCT

International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)

Volume 1, Issue 1, January 2021

Impact Factor: **4.819**

A) Net Sown Area (Area under Cultivation)

The net sown area shows positive correlation with population density, irrigation, agricultural density, wheat, oilseeds, cotton, vegetables, sugarcane and maize. The net sown area had found strong positive correlation with population density (0.50), weak moderate correlation established between net sown area with irrigation (0.49), oilseeds (0.35) and Cotton (0.33). At 0.001 levels low correlation of net sown area has found with Agricultural density (0.21), Wheat (0.20), Sugarcane (0.15), Maize (0.12) and Vegetable (0.08). The negative correlation shows net sown area with bajara, jawar, pulses, rice, fodder crop, fruits and condiments and spices. This fact explains that the increased net sown area does not proportionally increase the area under bajara, jawar, pulses, rice, fodder crop, fruits and condiments and spices. It had observed that the moderate negative correlation of net sown area found with bajara (-0.42) and jawar (-0.41) low negative correlation had established with fruits (-0.26), rice (-0.17), pulses (-0.14), fodder crops and condiments and spices (-0.12). This indicates that the increase in areal extent under net sown area does not proportionally increase area under bajara, jawar, pulses, rice, fodder crop, fruits and condiments and spices.

Table 1 : Correlation Matrix

Variables	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12	X13	X14	X15	X16	X17
X1	1.00																
X2	0.50	1.00															
X3	0.49	0.62	1.00														
X4	0.21	0.21	-0.23	1.00													
X5	-0.42	-0.12	-0.04	0.15	1.00												
X6	-0.41	-0.68	-0.49	0.16	0.11	1.00											
X7	0.20	0.65	0.33	0.19	-0.08	-0.49	1.00										
X8	0.35	0.74	0.33	0.52	-0.05	-0.37	0.59	1.00									
X9	-0.14	-0.15	-0.19	0.55	-0.13	0.48	-0.19	0.09	1.00								
X10	0.33	0.29	0.34	-0.01	-0.24	-0.35	-0.18	0.04	-0.08	1.00							
X11	-0.17	-0.18	-0.30	-0.26	-0.31	-0.27	-0.12	-0.13	-0.10	-0.21	1.00						
X12	0.08	0.25	0.04	0.20	0.22	-0.53	0.35	0.49	-0.17	-0.02	0.06	1.00					
X13	-0.12	-0.03	-0.20	-0.19	-0.30	-0.38	0.04	-0.01	-0.09	-0.21	0.98	0.14	1.00				
X14	0.15	0.33	-0.02	0.09	-0.14	-0.47	0.23	-0.09	-0.14	0.60	-0.13	0.04	-0.08	1.00			
X15	-0.26	0.32	0.02	0.18	0.43	-0.05	-0.18	0.15	0.13	0.34	-0.26	-0.01	-0.25	0.31	1.00		
X16	0.12	0.48	0.12	0.44	0.03	-0.35	0.59	0.82	0.00	0.10	-0.15	0.73	-0.06	0.03	0.06	1.00	
X17	-0.12	-0.17	-0.35	-0.22	-0.37	-0.30	-0.13	-0.15	-0.12	-0.11	0.99	0.05	0.96	0.00	-0.25	-0.16	1.00
(Value significant at 0.001 level)																	

B) Population Density

The population density shows positive correlation with net sown area, irrigation, vegetable, fruits, wheat, agriculture density, sugarcane, cotton, maize and oilseeds. The population density had found strong positive correlation with wheat (0.65), irrigation (0.62) and net sown area (0.50) while moderate correlation established between population density and maize (0.48), sugarcane (0.33) and fruits (0.32) and low correlation of population density has found with cotton (0.29), vegetables (0.25) and agricultural density (0.21) at 0.001 levels. The negative correlation shows of population density with jawar, bajara, pulses, rice, fodder crops and condiments and spices. It had observed that the strong negative correlation of population density found with jawar (-0.68), moderate negative correlation had established with rice (-0.18), condiments and spices (-0.17), pulses (-0.15) and bajara (-0.12), while population density had found very lowest negative correlation with fodder crop (-0.03) in the district.

C) Irrigation

Irrigation shows positive correlation with cotton, wheat, oilseeds, vegetable, fruits and maize, net sown area and population density. The strong positive correlation of irrigation had found with population density (0.62) while moderate correlation established between irrigation and net sown area (0.49), Cotton (0.34), wheat and oilseeds (0.33) and low correlation of irrigation had found with maize (0.12), while very low correlation of irrigation had found with (vegetables (0.04) and fruits (0.02) at 0.001 levels. The spatial distribution of irrigation in the district shows negative

correlation with Jawar, condiments and spices, rice, agricultural density, fodder crops, pulses, bajara and sugarcane. It observed that the moderate negative correlation had established with Jawar (-0.49), condiments and spices (-0.35) and rice (-0.30) while lowest negative correlation of irrigation had found with agricultural density (-0.23), fodder crop (-0.20) and pulses (-0.19) and very lowest negative correlation of irrigation had found with bajara (-0.04) and sugarcane (-0.02) in the district.

D) Agriculture Density

Agriculture density show positive correlation with pulses, oilseeds, maize, irrigation, vegetable, wheat, fruits, jawar and bajara. The strong positive correlation of agriculture density has found with Pulses (0.55) and oilseed (0.52) while moderate correlation established between agriculture density with maize (0.44) and low correlation of agriculture density had found with population density and irrigation (0.21), vegetable (0.20), wheat (0.19), fruits (0.18), jawar (0.16), bajara (0.15) while very low correlation of agriculture density had found with sugarcane (0.09) at 0.001 levels. The spatial distribution of agriculture density in the district shows negative correlation with rice, irrigation, condiments and spices, fodder crop and cotton. It had observed that the low negative correlation of agriculture density found with rice (-0.26), irrigation (-0.23), condiments and spices (-0.22) and fodder crops (-0.19), while very lowest negative correlation of agriculture density had found with cotton (-0.01) in the district.

E) Area Under Bajra

The area under bajra showed positive correlation with fruits, vegetable, agricultural density, jawar, maize. The moderate positive correlation of area under bajra had found with fruits (0.43) while low correlation of area under bajra had found with vegetable (0.22) agricultural density (0.15) and jawar (0.11) and very low correlation of area under bajra had found with maize (0.03) at 0.001 levels. The spatial distribution of area under bajra in the district shows negative correlation with net sown area, condiments and spices, rice, fodder crop, cotton, sugarcane, pulses, population density, wheat, oilseed and irrigation. It had observed that the moderate negative correlation had established with net sown area (-0.42), condiments and spices (-0.37), rice (-0.31) and fodder crop (-0.30) while lowest negative correlation of area under bajra had found with cotton (-0.24), sugarcane (-0.14), pulses (-0.13) and population density (-0.12). Very lowest negative correlation of area under bajra had found with wheat (-0.08), oilseeds (-0.05) and irrigation (-0.04) in the district.

F) Area Under Jawar

Area under jawar showed positive correlation with pulses, agricultural density and bajara. The moderate positive correlation of area under jawar had found with pulses (0.49) while low correlation established between areas under jawar had found agricultural density (0.16) and bajara (0.11) at 0.001 levels. The spatial distribution of area under jawar in the district shows negative correlation with population density, vegetables, wheat, sugarcane, net sown area, fodder crop, oilseed, cotton, maize, condiment and spices, rice and fruits. It had observed that the strong negative correlation of area under jawar found with population density (-0.68) and vegetable (-0.53) while moderate negative correlation established between area under jawar had found irrigation and wheat (-0.49), sugarcane (-0.47), net sown area (-0.41), fodder crop (-0.38), oilseed (-0.37), cotton and maize (-0.35), condiment and spices (-0.30). Low negative correlation of area under jawar had found with rice (-0.27) and very lowest negative correlation of area under jawar had found with fruits (-0.05) in the district.

G) Area Under Wheat

The area under wheat showed positive correlation with population density, oilseed, maize, vegetable, irrigation, sugarcane, net sown area, agricultural density, fodder crop. The strong positive correlation of area under wheat had found with population density (0.65) and oilseed and maize (0.59), while moderate correlation established between area under wheat had found with vegetable (0.35) and irrigation (0.33) and low correlation of area under wheat had found with sugarcane (0.23), net sown area (0.20) and agricultural density (0.19). Very low correlation of area under wheat had found with fodder crop (0.04) at 0.001 levels.

The spatial distribution of area under wheat in the district shows negative correlation with wheat, population density, vegetable, irrigation, fruits, net sown area, sugarcane, fodder crops, Jawar and oilseeds. It has observed that the moderate negative correlation had established with jawar (-0.49), while lowest negative correlation of area under wheat had found with pulses (-0.19), cotton and fruits (-0.18), condiment and spices (-0.13), rice (-0.12). Very low correlation of area under wheat had found with bajara (-0.08) at 0.001 levels in the district.

H) Area Under Oilseeds

Area under oilseeds showed positive correlation with maize, population density, wheat, agricultural density, vegetable, net sown area, irrigation, fruits and pulses. The very strong positive correlation of area under oilseed had found with maize (0.82) and population density (0.74). The strong positive correlation of area under vegetable had found with wheat (0.59), agricultural density (0.52) and vegetables (0.49), while moderate correlation established between area under oilseeds had found with net sown area (0.35) and irrigation (0.33), and low correlation of area under oilseeds had found with fruits (0.15) while very low correlation of area under oilseeds had found with pulses (0.09) and cotton (0.04) at 0.001 levels.

The spatial distribution of area under oilseed in the district showed negative correlation with jawar, oilseed, condiment and spices, rice, sugarcane, bajara and fodder crops. It had observed that the strong negative correlation of area under oilseed found with jawar (-0.37) while low negative correlation established between area under oilseed and condiment and spices (0.15), rice (-0.13) and very low lowest negative correlation of area under oilseed had found with sugarcane (-1.09), bajara (-0.05) and fodder crop (-0.01) in the district.

I) Area Under Pulses

Area under pulses showed positive correlation with agricultural density, jawar, fruits, oilseed and maize. The strong positive correlation of area under pulses had found with agricultural density (0.55) and jawar (0.48), while low correlation established between areas under pulses had found with fruit (0.13), and very low correlation of area under pulses had found with oilseeds (0.09) and maize (0.00) at 0.001 levels.

The spatial distribution of area under pulses in the district showed negative correlation with wheat, vegetables, population density, sugarcane, net sown area, bajara, condiments and spices, rice, fodder crops and cotton. It had observed that the low negative correlation established between area under pulses had found with irrigation, wheat (-0.19), vegetables (-0.17) population density (-0.15), sugarcane and net sown area (-0.14), bajara (-0.13), condiments and spices (-0.12) and rice (-0.10), and very low negative correlation of area under pulses had found with fodder crops (-0.09) and cotton (-0.08) in the district.

J) Area Under Cotton

Area under cotton showed positive correlation with net sown area, population density, sugarcane, irrigation, maize and oilseed. The strong positive correlation of area under cotton had found with Sugarcane (0.60), moderate positive correlation of area under cotton had found with Fruits and irrigation (0.34), Net sown area (0.33), while low correlation established between area under cotton had found with population density (0.29), maize (0.10) and very low correlation of area under cotton had found with oilseeds (0.04) at 0.001 levels.

The spatial distribution of area under cotton in the district showed negative correlation with jawar, bajara, fodder crop, wheat, condiments and spices, pulses, vegetables and agricultural density. The moderate negative correlation of area under cotton had found with jawar (-0.35). It had observed that the low negative correlation established between area under cotton had found with bajara (-0.24), rice and fodder crop (-0.21), wheat (-0.18) and condiments and spices (-0.11), and very low negative correlation of area under pulses had found with pulses (-0.08), vegetable (-0.02) and agricultural density (-0.01) in the district.

K) Area Under Rice

Area under rice showed positive correlation with condiments and spices, fodder crops and vegetables. The very strong positive correlation of area under cotton had found with condiments and spices (0.99) and fodder crops (0.98),

IJARSCT

ISSN (Online) 2581-9429
ISSN (Print) 2581-XXXX

International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)

Volume 1, Issue 1, January 2021

Impact Factor: 4.819

while very low correlation established between areas under rice had found with vegetable (0.06) at 0.001 levels. The spatial distribution of area under rice in the district showed negative correlation with bajara, irrigation, jawar, agricultural density, fruits, cotton, population density, net sown area, maize, fodder crop, oilseed, wheat and cotton. The moderate negative correlation of area under rice had found with bajara (-0.31) and irrigation (0.30). It had observed that the low negative correlation established between area under rice had found with jawar (-0.27), agricultural density and fruits (-0.26), cotton (-0.21), population density (-0.18), net sown area (-0.17), maize (-0.15), fodder crops and oilseed (-0.13), wheat (-0.12) and cotton (-0.10) in the district.

L) Area Under Vegetables

The area under vegetables showed positive correlation with maize, oilseeds, wheat, population density, bajara, agricultural density, fodder crop, net sown area, rice, condiments and spices, irrigation and sugarcane. The strong positive correlation of area under vegetables had found with maize (0.73) while moderate correlation established between areas under vegetables had found with oilseeds (0.49) and wheat (0.35), and low correlation of area under vegetables had found with population density (0.25), bajara (0.22), agricultural density (0.20) and fodder crops (0.14). Very low correlation of area under vegetables had found with net sown area (0.08), rice (0.06), condiments and spices (0.05), irrigation and sugarcane (0.04) at 0.001 levels.

The spatial distribution of area under vegetables in the district showed negative correlation with jawar, pulses, cotton and fruit. It had observed that the strong negative correlation had established with jawar (-0.53), while lowest negative correlation of area under vegetables had found with pulses (-0.17) while very low correlation of area under vegetables had found with cotton (-0.02) and fruit (-0.01) at 0.001 levels in the district.

M) Area Under Fodder Crop

The area under fodder crop showed positive correlation with rice, condiments and spices and vegetables. The very strong positive correlation of area under fodder crop had found with rice (0.98) and condiments and spices (0.96) while low correlation established between areas under fodder crop had found with vegetable (0.14) at 0.001 levels.

The spatial distribution of area under fodder crop in the district showed negative correlation with jawar, bajara, fruits, cotton, irrigation, agricultural density, net sown area, pulses, sugarcane, condiment and spices, wheat, population density and oilseeds. It had observed that the moderate negative correlation has established with jawar (-0.38) and bajara (-0.30), while lowest negative correlation of area under fodder crop had found with fruit (-0.25), cotton (-0.21) and irrigation (-0.20), and very low correlation of area under fodder crop had found with agricultural density (-0.19), net sown area (-0.12), pulses (-0.09), sugarcane (-0.08), condiments and spices (-0.06), wheat (-0.04), population density (-0.03) and oilseeds (-0.01) at 0.001 levels in the district.

N) Area Under Sugarcane

The area under sugarcane showed positive correlation with cotton, population density, fruits, wheat, net sown area, agricultural density, vegetables, maize and condiments and spices. The very strong positive correlation of area under sugarcane had found with cotton (0.60), while moderate correlation established between areas under sugarcane had found with population density (0.33) and fruits (0.31), and lowest correlation established between area under sugarcane had found with wheat (0.23) and net sown area (0.15). Very low correlation established between area under sugarcane had found with agricultural density (0.09), vegetables (0.04), maize (0.03) and condiments and spices (0.00) at 0.001 levels.

The spatial distribution of area under sugarcane in the district showed negative correlation with jawar, pulses, rice, oilseeds, fodder crops and irrigation. It had observed that the strong negative correlation has established with jawar (-0.47), while low negative correlation of area under sugarcane had found with bajara and pulses (-0.14), rice (-0.13), and very low correlation of area under sugarcane had found with oilseeds (-0.09), fodder crops (-0.08) and irrigation (-0.02) at 0.001 levels in the district.

IJARSCT

ISSN (Online) 2581-9429
ISSN (Print) 2581-XXXX

International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)

Volume 1, Issue 1, January 2021

Impact Factor: 4.819

O) Area Under Fruits

The area under fruits showed positive correlation with bajara, cotton, population density, sugarcane, agricultural density, oilseeds, pulses, maize and irrigation. The moderate positive correlation of area under fruits had found with bajara (0.43), cotton (0.34), population density (0.32) and sugarcane (0.31), while low correlation established between areas under fruits had found with agricultural density (0.18), oilseeds (0.15) and pulses (0.13). Very low correlation established between areas under fruits had found with maize (0.06) and irrigation (0.02) at 0.001 levels.

The spatial distribution of area under fruits in the district showed negative correlation with net sown area, rice, fodder crops, condiments and spices, wheat, jawar and vegetables. It has observed that the low negative correlation had established with net sown area and rice (-0.26), fodder crops and condiments and spices (-0.25), wheat (-0.18), and very low correlation of area under fruits had found with jawar (-0.05) and vegetables (-0.01) at 0.001 levels in the district.

P) Area Under Maize

The area under maize showed positive correlation with oilseeds, vegetables, wheat, population density, agricultural density, net sown area, irrigation, cotton, fruits, bajara, sugarcane and pulses. The very strong positive correlation of area under maize had found with oilseeds (0.82) and strong positive correlation of area under maize had found with vegetables (0.73) and wheat (0.59), while moderate correlation established between areas under maize had found with population density (0.48) and agricultural density (0.44). Low correlation established between areas under maize had found with net sown area and irrigation (0.12) and cotton (0.10), and very low correlation established between area under maize had found with fruits (0.06), bajara and sugarcane (0.03) and pulses (0.00) at 0.001 levels.

The spatial distribution of area under maize in the district showed negative correlation with jawar, condiments and spices, rice and fodder crops. It had observed that the moderate negative correlation had established with jawar (-0.35), and lowest correlation of area under maize had found with condiments and spices (-0.16) and rice (-0.15), while very low correlation of area under maize had found with fodder crops (-0.06) at 0.001 levels in the district.

Q) Area Under Condiments and Spices

The area under condiments and spices showed positive correlation with rice, fodder crops, vegetables and sugarcane. The very strong positive correlation of area under condiments and spices had found with rice (0.99) and fodder crops (0.96), while very low correlation established between area condiments and spices had found with vegetables (0.05) and sugarcane (0.00) at 0.001 levels.

The spatial distribution of area under condiments and spices in the district showed negative correlation with bajara, irrigation, jawar, fruits, agricultural density, population density, maize, oilseeds, wheat, net sown area, pulses and cotton. It had observed that the moderate negative correlation had established with bajara (-0.37) and irrigation (-0.35), and lowest correlation of area under condiments and spices had found with jawar (-0.30), fruits (-0.25), agricultural density (-0.22), population density (-0.17), maize (-0.16), oilseeds (-0.15), wheat (-0.13), net sown area and pulses (-0.12) and cotton (-0.11) at 0.001 levels in the district.

VII. CONCLUSION

- The correlation coefficient establishes relationship between seventeen variables.
- The correlation coefficient establishes relationship between chosen variables. The very strong positive correlation was found between percentage of rice and condiments and spices (0.99), rice and fodder (0.98), fodder crops and condiments and spices (0.96), oilseeds and maize (0.82) and population density and oilseed (0.74).
- The strong positive correlation was found between percentage of vegetables and maize (0.73), population density and wheat (0.65), population density and irrigation (0.62), cotton and sugarcane (0.60), wheat and maize (0.59), wheat and oilseeds (0.59), agricultural density and pulses (0.55), agricultural density and oilseeds (0.52) and net sown area and population density (0.50).

- The moderate positive correlation was found between percentage of net sown area and irrigation (0.49), oilseeds and vegetables (0.49), population density and maize (0.48), agricultural density and maize (0.48), jawar and pulses (0.48), bajara and maize (0.44), net sown area and oil seeds (0.35), wheat and vegetables (0.35), cotton and fruits (0.34), irrigation and cotton (0.34), irrigation and wheat (0.33), irrigation and oilseeds (0.33), net sown area and cotton (0.33), population density and sugarcane (0.33), population density and fruits (0.32) and sugarcane and fruits (0.31).

- This fact explains that areal extents of above crops are increasing with increasing area under net sown area and therefore the variables show positive correlation.

- Negative correlation established between population density and jawar (0.68), jawar and vegetables (0.53), irrigation and jawar (0.49), jawar and wheat (0.49), jawar and sugarcane (0.47), net sown area and bajara (0.42), jawar and fodder crop (0.38), jawar and oil seed (0.37), bajara and condiments and spices (0.37), jawar and cotton (0.35), jawar and maize (0.35), irrigation and condiments and spices (0.35), Bajara and Rice (0.31), bajara and fodder crop (0.30), irrigation and rice (0.30) and jawar and condiments and spices (0.30). These variables are not experiencing a proportional increase in area in the district and therefore show negative correlation.

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